

PIONOCARPUS BECOMES IOSTEPHANE
(COMPOSITAE: HELIANTHEAE):
A SYNOPSIS

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ABSTRACT

Iostephane comprises four Mexican species, including ***Iostephane madrensis*** (S. Wats.) Strother (≡*Helianthella madrensis*, the type of *Pionocarpus* S. F. Blake). The species are clearly allied with members of Heliantheae but without an obvious nearest relative.

Perpetuation of *Pionocarpus* (a pappose monotype) is no longer tenable, in view of overall agreement in habitat preference, habit, and details of vegetative and floral morphology among members of *Iostephane* (originally characterized as epappose) and *P. madrensis*, which is here transferred to *Iostephane*. Indeed, some plants of *I. madrensis* from Durango and Zacatecas very closely approach, in vegetative and floral detail, plants of *I. papposa* from Oaxaca. One robust specimen from Durango (see discussion of *I. madrensis*) may be a hybrid between *I. madrensis* and *I. heterophylla*. Rather than make a bald transfer, I append a taxonomic synopsis of the now four species of *Iostephane*.

Members of *Iostephane* are all subscapiform, heavy-rooted perennials that inhabit pine, oak, or pine-oak forests between 1500 and 3000 m in Mexico, ranging from Sinaloa, Chihuahua, and Durango east and south to western Veracruz and central Chiapas. With regard to floral characteristics, the plants are clearly allied with members of Helianthinae s.str., near to but isolated from plants now assigned to *Viguiera* H.B.K. s.l.

IOSTEPHANE Benth. in Benth. & Hook., Gen. Pl. 2:368. 1873.—TYPE: IOSTEPHANE HETEROPHYLLA (Cav.) Benth. ex Hemsl. ≡ *Coreopsis heterophylla* Cav.
Pionocarpus S. F. Blake, Proc. Amer. Acad. Arts 51:521. 1916.—TYPE: *Pionocarpus madrensis* (S. Wats.) S. F. Blake ≡ *Helianthella madrensis* S. Wats. ≡ IOSTEPHANE MADRENSIS (S. Wats.) Strother.

Scapiform perennial herbs to 15 dm high, rhizomatous from tuberiform rootstocks; leaves mostly in basal rosettes, very variable among plants, less so within plants, petioles winged, at least distally, blades membranous to coriaceous, lanceolate to broadly ovate or deltoid,

often with a deep, rounded sinus on each side, thus pandurate to 3-lobed, cuneate to subtruncate or subcordate basally, obtuse to acute or acuminate apically, entire to subentire to coarsely dentate with callous teeth, coarsely scabrous to nearly glabrous; heads solitary or 2-5(-12) in very loose associations; peduncles scapiform, bracteate, often swollen and fistulose distally; involucre turbinate to hemispheric, 1-2 cm high; phyllaries 12-26 in 2(-3) series, herbaceous, subequal, lance-linear to broadly lanceolate or lance-ovate, acute to acuminate, strigo-pilose; paleae scario-cartilaginous, navicular, keeled or not, acuminate, pungent, closely strigose; receptacles convex to conical; ray florets 8-21, neutral or styliferous but infertile, corollas purplish to pink (sometimes white) or yellow to orange, tube stout, lamina oblong to ovate, showy; disc florets 15-110+, perfect, corollas yellow (sometimes with purplish lobes), tube usually glabrous, length $\leq \frac{1}{3}$ that of the abruptly ampliate, cylindrical, sparsely pubescent to densely hispidulous throat, lobes 5, equal, narrowly deltoid, abaxially pubescent; anthers blackish, very slender, minutely sagittate; style branches rather stout, abruptly hispidulo-penicillate; achenes purplish black, slightly laterally compressed, oblong-obovate in profile, typically quadrate in cross-section, glabrous to strigose; pappus none or of 0-2 fragile or deciduous, setose squamellae 1-3 mm long plus 0-4(-18) erose-lacerate, free or connate squamellae 0.5-1 mm long; chromosome number, $x = 17$.

Key to species of *Iostephane*

- Phyllaries mostly lanceolate to lance-ovate, (3-)4-7 mm wide; ray corollas purple to pink (rarely white), lamina 25-58 mm long *I. heterophylla*
- Phyllaries mostly linear to lance-linear, 1.5-3(-4) mm wide; ray corollas yellow to orange, lamina 9-31 mm long.
- Ray florets mostly 5-9; disc florets mostly 15-40, corollas 5(4.2-6) mm long; achenes mostly 3.5-4.5 mm long, glabrous; epappose *I. trilobata*
- Ray florets mostly 13(8-16); disc florets mostly 35-60, corollas 6(5.5-8.5) mm long; achenes mostly 4.5-5.5 mm long, sparsely to prominently strigose; pappus of setose and/or erose-lacerate scales.
- Leaf blades typically linear to narrowly lanceolate, length mostly 5-8+ times width, none lobed; pappus of 0-2 setae plus 10-18 erose scales; nw. Mexico *I. madrensis*
- Leaf blades typically ovate to deltoid to broadly lanceolate, length mostly 1-3 times width, often some or all lyrate to pandurate; pappus of 0-2 setae plus 2-4 erose scales; se. Mexico *I. papposa*

- IOSTEPHANE HETEROPHYLLA** (Cav.) Benth. ex Hemsl., Biol. Cen. Amer. Bot. 2:168. 1881.—*Coreopsis heterophylla* Cav., Icon. Pl. 3:34, pl. 268. 1795.—*Simsia heterophylla* (Cav.) Pers., Synop. Pl. 2:478. 1807.—*Ximenesia cavanillesii* Spreng., Syst. Veg., 16th ed. 3:605. 1826, nom. nov.—*Echinacea heterophylla* (Cav.) D. Don in Sweet, Brit. Fl. Gard. ser. 2. 1: pl. 32. 1831 [1830].—**TYPE:** Grown in Madrid from Mexican seed; the plate fixes application of the name.
- Rudbeckia napifolia* H.B.K., Nov. Gen. Sp. 4:244. 1820.—**TYPE:** "Crescit juxta Santa Rosa de la Sierra, alt. 1300 hex (Nova Hispania). 4 Floret Septembri," *Humboldt and Bonpland s.n.* (Holotype: P, microfiche!).
- Echinacea dicksonii* Lindl., Edward's Bot. Reg. 24: pl. 27. 1838.—*Iostephane heterophylla* (Cav.) Benth. ex Hemsl. var. *dicksonii* (Lindl.) W. M. Sharp, Ann. Missouri Bot. Gard. 22:82. 1935.—**TYPE:** Grown in England by the Horticultural Society from Mexican seed; the plate fixes application of the name.
- Echinacea dubia* Knowl. & Westc., Fl. Cab. 3:163, pl. 131. 1839.—**TYPE:** Grown by Birmingham Botanical and Horticultural Society from Mexican seed; the plate fixes application of the name.
- Iostephane heterophylla* (Cav.) Benth. ex Hemsl. var. *acutiloba* W. M. Sharp, Ann. Missouri Bot. Gard. 22:83. 1935.—**TYPE:** Mexico, Jalisco, near Guadalajara, Aug 1893, *C. G. Pringle 4480* (Holotype: MO!; isotypes: F!, GH!, MIN!, MO!, MSC!, NY!, UC!, US!).

Plants 3–9(–15) dm high; petioles 4–12(2–25) cm long, leaf blades 6–15(3–27) cm long, 5–12(2–18) cm wide; phyllaries 14–26, lance-ovate to lanceolate, 16(8–28) mm long, 3–7 mm wide; paleae 8.4–11.8 mm long; ray florets 8–21, corollas typically purple to magenta or pinkish, exceptionally white (e.g., Guerrero, *Moore 4534*, A, MICH), lamina 25–58 mm long; disc florets 50–100+, corollas 6.2–9.1 mm long; achenes 3.6–6.6 mm long, sparsely to moderately strigillose; pappus none or of 1–2 setose squamellae 1–2 mm long plus 0–4+ cuneate to lanceolate, erose to lacerate scales less than 1 mm long (e.g., Puebla, Aug 1908, *Purpus s.n.*, UC); chromosome number, $2n = 34$.

Known mostly from pine, oak, and pine-oak forests or adjacent clearings or meadows, sometimes drier forest with junipers, 1500–3000 m, in Mexican states: Chih., Sin., Dgo., S.L.P., Gto., Aguasc., Jal., Mich., Mex., D.F., Hgo., Pue., Mlos., Gro., Ver., and Oax.

- Iostephane madrensis** (S. Wats.) Strother, comb. nov.—*Helianthella madrensis* S. Wats., Proc. Amer. Acad. Art 23:278. 1888.—*Pionocarpus madrensis* (S. Wats.) S. F. Blake, Proc. Amer. Acad. Arts 51:522. 1916.—**TYPE:** Mexico, Chihuahua, "pine plains at the base of the Sierra Madre," Sep 1887, *C. G. Pringle 1302* (Holotype: GH!; isotypes: F!, NY-2!, US!).

Helianthella iostephanoides Greenm., Proc. Amer. Acad. Arts 40:41. 1904.—TYPE: Mexico, Zacatecas, "in the Sierra Madre," 18 Aug 1897, *J. N. Rose 2391* (Holotype: GH!; isotype: US!).

Plants mostly 3–7 dm high; petioles 6–12 cm long, leaf blades linear to lanceolate, 10–16(–25) cm long, 1–3(–6) cm wide; paleae 9–11 mm long; ray florets 9–16, corollas yellow, lamina 9–15(–30) mm long; disc florets 35–60, corollas 5.5–6 mm long; achenes 5–5.5 mm long, strigillose; pappus of 0–2 setose squamellae 2–3 mm long plus, typically, 10–18 free or connate, erose-lacerate scales 0.3–1 mm long; chromosome number unknown.

Known from pine and pine-oak forests between 2100 and 2650 m in Chih., Dgo., Gto., Jal., and Zac. *Breedlove 44199* (CAS) from 65–75 km sw. of Cd. Durango is exceptional in having leaf blades roughly 10–15 cm long by 4–6 cm wide and ray florets with laminas to 3 cm long. I first took the plant to be a yellow-rayed form of *I. heterophylla*. Now I think it may be a hybrid involving that taxon and *I. madrensis*. Pollen from the specimen appears to be normal and fertile (stained in lactophenol cotton-blue).

IOSTEPHANE PAPPOSA Fay, Brittonia 25:192. 1973.—TYPE: Mexico, Oaxaca, ca. 10 km s. of Suchix[s]tepec (ca. 95 km n. of Puerto Ángel), 2300 m, 8 Nov 1970, *A. Cronquist 10895* (Holotype: NY!; isotypes: ENCB!, MEXU, MICH!, UC!, UTC).

Plants 4–6 dm high; petioles 4–12(3–15) cm long, leaf blades 6–12 (–15) cm long, 3–6(–8) cm wide; phyllaries 18–22, lance-linear to linear, 8–15 mm long, 1.6–2.8 mm wide; paleae 8–10.5 mm long; ray florets 8–13, corollas yellow to orange, lamina 17–31 mm long; disc florets 30–50, corollas 5.9–8.5 mm long; achenes 4.2–4.5 mm long, sparsely strigillose; pappus of (1–)2 setose squamellae 1.5–3 mm long plus 2–6 cuneate to lanceolate, erose-lacerate scales ca. 0.5 mm long; chromosome number unknown.

Known only from six gatherings made in pine-oak forests in Oaxaca at 2200–2700 m: five from ca. 100 km s. of Oaxaca along route 175 from Oaxaca to Puerto Ángel (vicinity of type locality) and one from 2 km e. of Ixtan de Juarez, ca. 30 km ne. of Oaxaca (*Hill 1803*, NY).

IOSTEPHANE TRILOBATA Hemsl., Biol. Cen. Amer. Bot. 2:169. 1881.—TYPE: Mexico, Chiapas, without locality or date, *Ghiesbreght 101* (Holotype: K; isotype: GH!).

Rudbeckia chrysantha Klatt, Leopoldina 23:143. 1887.—[*Echinacea chrysantha* Sch.-Bip., in sched. fide Klatt, loc. cit.]—TYPE: Mexico, "Cumbre de Estepa," *Liebmann "575"* (Holotype: C; leaf and drawing: GH!).

Gymnolomia scaposa Brandegees, Univ. Calif. Publ. Bot. 4:93. 1910.—TYPE: Mexico, Puebla, near Coaxcatlan, oak forests, 8000–9000

ft, Sep 1909, *C. A. Purpus 4120* (Holotype: UC!; isotypes: F!, GH!, MO!, NY!, US!).

Plants 2–6 dm high; petioles 6–10(3–15) cm long, leaf blades 6–8(3–12) cm long, 3–4(2–6) cm wide; phyllaries 12–21, lance-linear to linear, 6–12 mm long, 1.5–3.1 mm wide; paleae 5.8–9.8 mm long; ray florets 5–9, corollas yellow to orange, lamina 9–20 mm long; disc florets 15–40, corollas 4.2–6 mm long; achenes 3.2–4.8 mm long, glabrous; pappus none; chromosome number, $2n = 34$, ca. 68.

Known from pine-oak forests between 1500 and 2600 m, principally in Chiapas and Oaxaca; other collections: Mexico, Cumbre de Estepa, *Liebmann 575* (GH); Mexico, near Nanchitla (ca. 80 km wsw. of Mexico City), 7 Oct 1933, *Hinton 4965* (GH, MO, NY, US); same locality, 15–16 Sep 1958, *Matuda 32806* (CAS, ENCB); Mexico, Cerro de Jilotepec (ca. 65 km nnw. of Mexico City), 27 Sep 1953, *Matuda 29094* (NY); Puebla, Coaxcatlan (se. of Tehuacan, ca. 18°16'N, 97°09'W), Sep 1909, *Purpus 4120* (F, GH, MO, NY, UC, US). Specimens of this species labeled as coming from Durango (*Jackson 7190* in UC and *7191* in NY) are actually from Oaxaca (Jackson, pers. comm.).

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